

# Chapter 9: Monitoring Enstore on the Web

There are several installed Enstore systems at Fermilab. Currently these include STKEN for general Fermilab users, CDFEN for CDF RunII, and D0EN for D0 RunII. For each Enstore system, a separate but structurally identical series of web pages is available for monitoring the system and any jobs you've submitted to it. The currently implemented websites for Enstore monitoring include:

- [http://www-stken.fnal.gov/enstore/enstore\\_system.html](http://www-stken.fnal.gov/enstore/enstore_system.html) for STKEN
- [http://www-cdfen.fnal.gov/enstore/enstore\\_system.html](http://www-cdfen.fnal.gov/enstore/enstore_system.html) for CDFEN
- [http://www-d0en.fnal.gov/enstore/enstore\\_system.html](http://www-d0en.fnal.gov/enstore/enstore_system.html) for D0EN

We recommend that you bookmark the appropriate one in your browser.

In this section, we briefly describe the format and function of the web pages that are of interest to users, and show you how to navigate them.

The Enstore pages present snapshots of the status of various components of the Enstore system, and the pages are updated and refreshed periodically. The auto-refresh time interval varies from page to page, and does not correspond with the information update interval, which also varies from page to page. See the online help screens for more detailed information.



Note for Netscape users: Links on these pages are intended to take you straight to the item of interest, not to the top of the page on which it's found. Due to a Netscape bug, you'll find yourself at the top of the target page. To get to the item of interest, place your cursor in the URL area of the browser and hit **ENTER**.

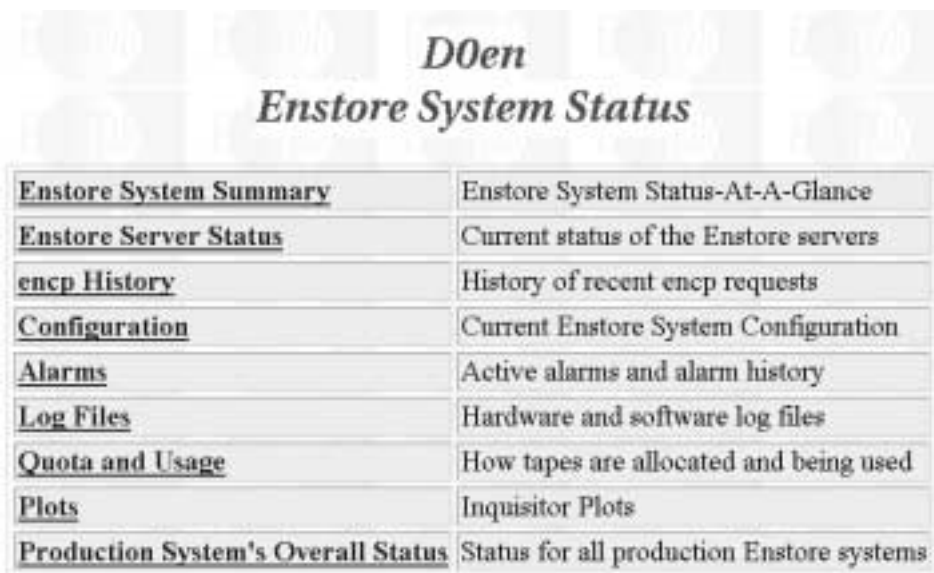
## 9.1 Top Page

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The top page for monitoring an Enstore system is located at <http://www-<xyz>en.fnal.gov/enstore/> (where <xyz> is one of `stk`, `cdf` or `d0`), as given above. This page has three sections, each containing links to other pages.

## 9.1.1 Enstore System Status Links

The links under the *Enstore System Status* heading lead to status web pages for the Enstore system and its servers, shown here for the D0en system:



<a href="#">Enstore System Summary</a>	Enstore System Status-At-A-Glance
<a href="#">Enstore Server Status</a>	Current status of the Enstore servers
<a href="#">encp History</a>	History of recent encp requests
<a href="#">Configuration</a>	Current Enstore System Configuration
<a href="#">Alarms</a>	Active alarms and alarm history
<a href="#">Log Files</a>	Hardware and software log files
<a href="#">Quota and Usage</a>	How tapes are allocated and being used
<a href="#">Plots</a>	Inquisitor Plots
<a href="#">Production System's Overall Status</a>	Status for all production Enstore systems

The pages to which these links point (with the exceptions of *Quota and Usage* and *Production System's Overall Status*<sup>1</sup>) share a header format, described in section 9.2 *Header Format for Status Pages*.

## 9.1.2 Information

Under the *Information* header are links for finding help, documentation, and so on.

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1. *Quota and Usage* links to a text file with no header; and *Production System's Overall Status* has the header elements on the right-hand side only.

<i>Information</i>	
<a href="#">Enstore Help</a>	Help on command line options
<a href="#">enstore.conf Help</a>	Help on enstore.conf and network control
<a href="#">Volume Import</a>	How to import data into the Enstore environment
<a href="#">Tape Inventory</a>	Detailed list of tapes and their contents
<a href="#">Cronjob Status</a>	Plots of cronjob exit status for past week
<a href="#">Documentation</a>	Design documents, Talks, Reports, Bug list etc.
<i>Command Access</i>	
<a href="#">Enstore User Commands</a>	On-line Enstore Functionality

## 9.2 Header Format for Status Pages

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Here we see the header for the **Status At-A-Glance** page (from the link “Enstore System Summary” on the top page):



Header elements:

- In the upper-right corner you’ll find the page title, **Enstore Status At-A-Glance**, in this case.
- Underneath the page title is the name of the Enstore server that created this web page (e.g., SPAM, System Performance And Monitoring), and the date and time that the current page was created. If the time shown here is more than a few minutes earlier than the current time, you should refresh your browser window to get updated information.
- The buttons in the upper-left corner are quick links to different pages:  
**Home**                      the top page, described in section 9.1 *Top Page*

<b>System</b>	the <b>Status At-A-Glance</b> page, described in section 9.3 <i>Enstore System-At-A-Glance Page</i> (the page associated with the “Enstore System Summary” link on the top page; it is the page shown in the above image)
<b>Servers</b>	the <b>Enstore Server Status</b> page, described in section 9.4 <i>Enstore Server Status</i> (the page associated with the “Enstore Server Status” link on the top page)
<b>Encp</b>	the <b>Encp History</b> page, described in section 9.10 <i>Encp History</i> (the page associated with the “encp History” link on the top page)
<b>Help</b>	page-specific online help

- Underneath these buttons you’ll find the Enstore system identifier; in the above image, it is *D0EN: Enstore for the D0/RunII AML/2*.

## 9.3 Enstore System-At-A-Glance Page

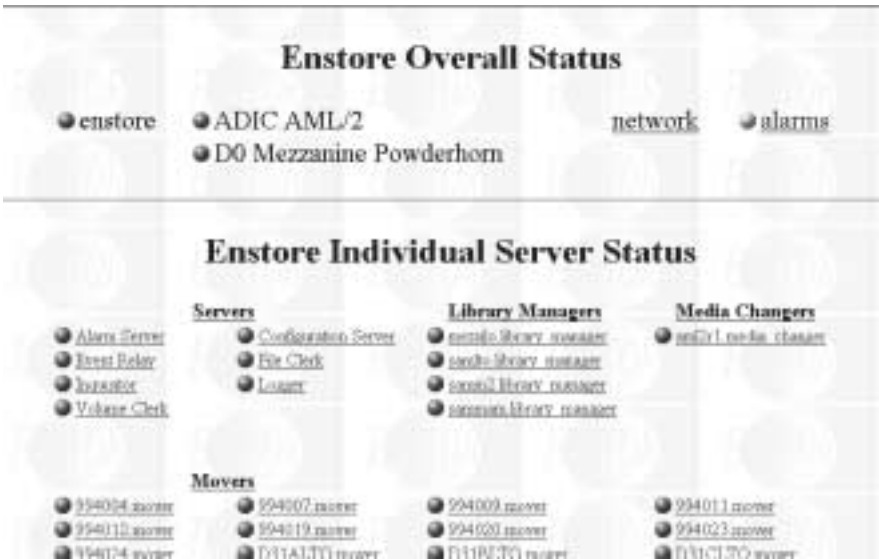
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- What?** The **System-At-A-Glance** page presents summarized information indicating which parts of the Enstore system are up and working, which parts have problems, which have a scheduled outage, and other system information. It also provides a mapping between Enstore servers and the nodes that run them.
- Why?** Start at this page when investigating any possible problem. This page indicates which if any components of your Enstore system are experiencing problems.
- How?** To arrive at this page, start at the top page and click “Enstore System Summary”, or click the **SYSTEM** button on any of the pages.

The Enstore components and servers listed on this page are described in Chapter 8: *Overview of the Enstore Servers*.

## Page Description

The page is divided into two sections. They list indicators and servers, and code them with colored ball icons to indicate their status.



### *Enstore Overall Status*

summarizes the status (from left to right) of Enstore as a whole, the tape robots, the network, and alarm components. There are only two links:

The “network” link in this section takes you to *Enstore Network Interface Status* (separate page, but title also **Status-At-A-Glance**) which lists the nodes in the Enstore system and indicates the status of the data communications between a base node displayed above the list, and each listed node.

The “alarms” link takes you to the **Enstore Active Alarms** page described in section 9.12 *Enstore Active Alarms*.

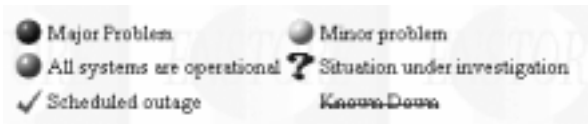
### *Enstore Individual Server Status*

lists all servers (Chapter 8), library managers (section 8.4), movers (section 8.5), and media changers (section 8.6); includes individual status indicators. Each link in this section takes you to its corresponding server entry on the page described in section 9.4 *Enstore Server Status*.

Status indicators do not apply to the third section, which lists the nodes in the Enstore system and the servers that run on each of them. There is no status information.

Enstore Node/Server Mapping			
#Denserv10a	• D31ELTO mover	#Denserv11a	• 994011.mover
#Denserv12a	• 994012.mover	#Denserv13a	• D33M2 mover • D33M2 mover
#Denserv14a	• D31ELTO mover	#Denserv15a	• D42M2 mover • D43M2 mover
#Denserv16a	• D44M2 mover • D45M2 mover	#Denserv17a	• D31ELTO mover
#Denserv18a	• D31FLTO mover	#Denserv19a	• 994019.mover

There is a legend at the bottom of the page for the status icons which looks like this:



## 9.4 Enstore Server Status

- What?** As the page title implies, the **Enstore Server Summary** page provides the status of all the Enstore servers included in your system. This includes movers, library managers, and so on. The servers are described in Chapter 8: *Overview of the Enstore Servers*.
- Why?** Use this page to find out what a particular server is currently doing, and what work it has pending.
- How?** To arrive at this page, start at the top page and click “Enstore Server Status”, or click the **SERVERS** button on any of the pages.

### Page Description

The page is divided into two sections.



```

samito.library_manager      alive: unlocked           @0enavr4    2002-May-08 16:06:02
Ongoing Transfers          2 Pending Transfers      9 Full Queue

Reading PRK136L1 using D31ELTO mover from d0mno by sam
Reading PRK137L1 using D31CLTO mover from d0mno by sam
Pending read of PRK138L1 from d0mno by sam [VOL_BUSY]
Pending read of PRK137L1 from d0mno by sam [VOL_BUSY]
Pending read of PRK137L1 from d0mno by sam []

```

Statuses for library managers (LM) include:

alive : unlocked

LM is working normally

alive: locked LM is rejecting **encp** requests, but continues to assign jobs already in the pending queue to movers

alive: nowrite LM is locked for write requests

alive: noread LM is locked for read requests

alive: ignore LM is ignoring **encp** requests (returning “ok” to **encp**), but continues to assign jobs already in the pending queue to movers

alive: pause LM is ignoring **encp** requests, and holding pending jobs

## Movers

The link on a mover name points to the corresponding mover (MV) on the **Movers** page (described in section 9.9 *Movers Page*).

```

994004.mover      alive: busy reading 672,186,215 bytes from Enstore @0enavr4a 2002-May-08 16:06:01
994007.mover      alive: busy reading 666,703,730 bytes from Enstore @0enavr7a 2002-May-08 16:06:12
994009.mover      alive: busy reading 85,099,444 bytes from Enstore @0enavr9a 2002-May-08 16:06:14
994011.mover      alive: busy writing 720,432,999 bytes to Enstore @0enavr11a 2002-May-08 16:06:01
994012.mover      alive: busy reading 147,623,913 bytes from Enstore @0enavr12a 2002-May-08 16:05:41
994019.mover      alive: busy writing 1,077,222,538 bytes to Enstore @0enavr19a 2002-May-08 16:05:54
994020.mover      alive: busy writing 191,688,701 bytes to Enstore @0enavr20a 2002-May-08 16:05:58
994023.mover      alive: SEEK @0enavr23a 2002-May-08 16:05:51
994024.mover      alive: busy reading 651,112,208 bytes from Enstore @0enavr24a 2002-May-08 16:05:51
D31ALTO.mover     alive: IDLE @0enavr21a 2002-May-08 16:06:14
D31BLTO.mover     alive: IDLE @0enavr14a 2002-May-08 16:06:12
D31CLTO.mover     alive: SEEK @0enavr22a 2002-May-08 16:06:08
D31DLTO.mover     alive: IDLE @0enavr17a 2002-May-08 16:06:07
D31ELTO.mover     alive: SEEK @0enavr10a 2002-May-08 16:06:11
D31FLTO.mover     alive: busy mounting volume PRK138L1 @0enavr12a 2002-May-08 16:06:05

```

Statuses for movers include:

alive : IDLE MV is idle because there are no jobs to process

alive : SETUP MV is in initial phase of a job, it is setting up a connection with **encp** for a transfer

alive: busy mounting volume <volname>



	MV is waiting for the media changer to finish mounting a tape; the volume name is given
alive : SEEK	a tape is mounted, and the correct read or write location on the tape is being located
alive : busy reading/writing <n> bytes from/to Enstore	
	MV is reading data from Enstore, or writing data to Enstore; the number of bytes read or written so far is given
alive : busy dismounting volume <volname>	
	MV is waiting for media changer to finish dismounting a volume; the volume name is given
alive : HAVE BOUND volume - IDLE	
	MV has completed a job but is waiting for a subsequent job for same tape; tape is still in drive
alive: DRAINING	
	MV is completing last job before going offline; it will not accept more jobs
alive : CLEANING	
	a cleaning tape is in the drive; MV cannot accept more jobs until the cleaning has finished.
alive : OFFLINE	
	MV is offline and not accepting jobs (MV name displayed in orange)
alive : ERROR <text>	
	MV is in an error state described by the text, and cannot accept more jobs (MV name displayed in orange)

## Other Servers

Statuses for all the servers except movers and library managers:

alive	server is working normally
timed out	the inquisitor hasn't received the latest "I'm alive" message from the server
dead	duration of "timed out" status on server has exceeded configured limit (server name appears in orange)
not monitoring	server is known to the enstore system, but is not currently being monitored by the inquisitor (server name is displayed in gray)

## 9.5 Active File List

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- What?** The **Active File List** page lists the data files being actively worked on by your Enstore system. The files are listed by user node.
- Why?** Use this page to find your file. This is the right starting page for checking on your job if you only know the name of the file you're reading or writing (i.e., you don't know the volume or any Enstore server information). This page has links to pages containing more job-related information.
- How?** To arrive at this page, start at the top page and click "Enstore Server Status". Then under *Shortcuts*, click "Full File List".

### Page Description

The files are listed by their full path and name. For each file, the node from/to which it is being read/written is also given. This page doesn't distinguish between read and write.



Scroll as necessary or do a search to find your file in the list and click on it. This will take you to the **Library Manager Queues** page for the library manager servicing your job; see section 9.6 *Library Manager Queues*.

## 9.6 Library Manager Queues

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- What?** The **Library Manager Queues** page lists the **encp** jobs that a selected library manager is currently managing or has pending in a queue (**encp** is described in section 3.1 *Copying Files with Encp*). Movers in states other than busy or IDLE are listed at the bottom of the page (mover statuses are described in section 9.4 *Enstore Server Status*).
- Why?** Use this page to find out the status of a particular library manager's read and/or write queue(s) once you know which LM is servicing your job. You can find the status of your job, and its priority relative to other jobs in the queue. From this page you can click links to get full details on the processing of your file and on the volume associated with your file.
- How?** To arrive at this page, follow this string of links starting at the top page. Click "Enstore Server Status", then:
- If you know the filename but not the library manager, then under *Shortcuts*, click "Full File List". Click on your file of interest. This will take you to the **Library Manager Queues** page for the appropriate library manager.
  - If you know the library manager, you can click directly on the link in the second section of the **Enstore Server Status** page, instead.

### 9.6.1 Suspect Volumes

(no write-up yet)

### 9.6.2 File Reads

For the *Reads*, files are listed by volume. For each volume in use, the page lists the mover servicing it. Each **encp** job is listed on a separate line. The line lists the host to which the file is to be copied, the last 70 or so bytes of the filename (filenames can get quite long), the file's current priority in the queue, and the file's position on the tape. The files are ordered in the queue by priority.

[Home](#)
[System](#)
[Servers](#)
[Encp](#)
[Help](#)

# Library Manager Queues

Brought To You By : The Inquirer  
Last updated : 2003-Mar-01 11:12:49

D0EN: Enstore for the D0/RunII AML/2

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## mezsilo.library\_manager Page

Status : alive : unlocked

### Reads [Full Queue Elements](#)

<u>PRL291</u>	[at 994009 mover]	find09	/local/stage2/prd-cache/booa1_0000145891_163.raw	(CurPri: 40 File: 125)
		find01	/local/stage2/prd-cache/booa1_0000145891_166.raw	(CurPri: 40 File: 126)

To get full information on the library manager's processing, click *Full Queue Elements* next to *Reads* to arrive at the *Full Library Manager Info* page (described in section 9.7 *Full Library Manager Info*). To get full information on a volume being read, click the volume id at the top-left of the queue containing your file. This takes you to the text inventory page for that volume (described in section ).

## 9.6.3 File Writes

Under *Writes*, this page lists write jobs by file family. A mover is listed after the file family for a file only if the file is currently being worked on.

### Writes

d0farn_dag_reco_his	[at <a href="#">D11ELTO mover</a> ]	d0farn test34704more_in_progress/reco_id_0000146556_102.raw_p10:15:01_000	(CurPri: 40 FFWidth: 4)
	[at <a href="#">D11ELTO mover</a> ]	d0farn test34704more_in_progress/reco_id_0000146558_001.raw_p10:15:01_000	(CurPri: 40 FFWidth: 4)
	[at <a href="#">D11ELTO mover</a> ]	d0farn test34658more_in_progress/reco_id_0000150408_203.raw_p10:15:02_000	(CurPri: 40 FFWidth: 4)

Each file in the write queue appears on a separate line. Each line lists several pieces of information: the host from which the file is to be copied, the last several bytes of the filename (filenames can get quite long), and the current priority and file family width.

The mover name provides a link to the **Movers** page, described in section 9.9 *Movers Page*.

## Job Processing and File Family Width

Normally, the number of WRITE jobs running per file family can equal but not exceed the file family width (see section 1.3.2 *File Family Width*). If a READ job is running on a tape that is not marked full, this also counts against the width.



But note: Even if the number of current jobs equals the width, it is possible for a new READ job to start on a tape that's not full (if the tape is marked full, the width is not an issue and the READ job can start anyway) since the width is checked only when assigning WRITE jobs; thus temporarily, the width may be exceeded. Any pending WRITE job must wait until the the number of jobs that count against the width drops below the width value.

### 9.6.4 Additional Movers

Underneath this information, there may be a table listing additional movers.

Additional Mover	State	Volume	File Family
D31ALTO:mover	HAVE_BOUND	PRK175L1	mc_phase10_reco_fta
D31BLTO:mover	HAVE_BOUND	PRK174L1	mc_phase10_reco_fta
D31ELTO:mover	HAVE_BOUND	PRK133L1	mc_phase10_root-mple_fta

Movers that are in any of the following states are listed here (see section 9.4 *Enstore Server Status* for status descriptions):

- CLEANING
- DISMOUNT\_WAIT
- ERROR
- HAVE\_BOUND
- OFFLINE

Movers not listed anywhere on the page may be assumed to be IDLE, i.e., waiting for a job.

## 9.7 Full Library Manager Info

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**What?** The **Full Library Manager Info** page displays the job parameters for each file in a given library manager's current READ and WRITE queues (e.g., local file name, local node, file family, volume ID, priority, etc.).

- Why?** Use this page to find the status of a READ or WRITE job, e.g., the file's position in the queue, how long it's been in a queue, when it was "dequeued" (i.e., when processing started), and other details about how Enstore is processing it.
- How?** To arrive at this page, follow this string of links starting at the top page. Click "Enstore Server Status", find the library manager you want, and click "Full Queue Elements".
- If you don't know which LM you want but you know the file, take this route. On the **Enstore Server Status** page under *Shortcuts*, click "Full File List". On the **Active File List** page, click on your file of interest. This will take you to the **Library Manager Queues** page for the appropriate library manager. Here, click "Full Queue Elements" next to *Reads* to come to the **Full Library Manager Info** page. On this page, you can scroll down and locate your file.

## Page Description

[Home](#)
[System](#)
[Servers](#)
[Encp](#)
[Help](#)

# Full Library Manager Info

Brought To You By: The Inquisitor

Last updated: 2002-Mar-01 11:22:09

D0EN: Enstore for the D0/RunII AML/2

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Name	Status	Host	Date/Time	Last Time Alive
mezzillo.library_manager	alive : unlocked	@Deasrv4	2002-Mar-01 11:22:03	
None None				
<div> <div> <div>Reading tape</div> <div>994009.mover</div> </div> <div> <div>Device Label</div> <div>PRL291</div> </div> <div> <div>Job Submitted</div> <div>2002-Mar-01 11:10:52</div> </div> <div> <div>Priority</div> <div>Current: 40</div> </div> <div> <div>Local file</div> <div>/local/stage2/prod-cache/boofall_0000145891_205.raw</div> </div> <div> <div>Bytes</div> <div>330,720,169</div> </div> </div> <div> <div>Node</div> <div>fin019</div> </div> <div> <div>Port</div> <div>3196</div> </div> <div> <div>File Family</div> <div>datalogger_memoirs_copy1</div> </div> <div> <div>File Family Width</div> <div>*</div> </div> <div> <div>Dequeued</div> <div>2002-Mar-01 11:21:29</div> </div> <div> <div>Base</div> <div>40</div> </div> <div> <div>Delta</div> <div>20</div> </div> <div> <div>Age limit</div> <div>15</div> </div> <div> <div>ID</div> <div>fin019.finl.gov:1015002656-0-4046</div> </div>				

| Reading tape  994023.mover  Device Label  PRL290  Job Submitted  2002-Mar-01 11:13:32  Priority  Current: 40  Node  fin03  Port  1053  File Family  datalogger\_memoirs\_copy1  File Family Width  \*  Dequeued  2002-Mar-01 11:21:59  Base  40  Delta  20  Age limit  15 | | | | |

Your file will appear as one of two types of entries on this page: one type for files being worked on, and another for files pending in the queue.

Reading tape	994019 mover	Node	fn015	Port	1310
Device Label	FRL294	File Family	datalogger_mezzlo_copy1 File Family Width"		
Job Submitted	2002-Mar-01 11:10:52 Dequeued 2002-Mar-01 11:22:01				
Priorities	Current 40	Base 40	Delta 20	Agetime	15
Local file	/local/stage2/prd-cache/boe/all_0000145891_310.raw				
Bytes	287,951,606	ID	fn015.fnal.gov-1015002656-0-28037		

Pending Tape Read		Node	fn003	Port	1063
Device Label	FRL294	File Family	datalogger_mezzlo_copy1 File Family Width"		
Job Submitted	2002-Mar-01 11:17:00				
Priorities	Current 40	Base 40	Delta 20	Agetime	15
Local file	/local/stage2/prd-cache/boe/all_0000145891_184.raw				
Bytes	585,249,908	ID	fn003.fnal.gov-1015003020-0-29330		
Reason for Pending	VOL_BUSY				

For those files being worked on, the mover name is given, and it provides a link to the **Movers** page, described in section 9.9 *Movers Page*.

## 9.8 Tape Inventory Page (Text)

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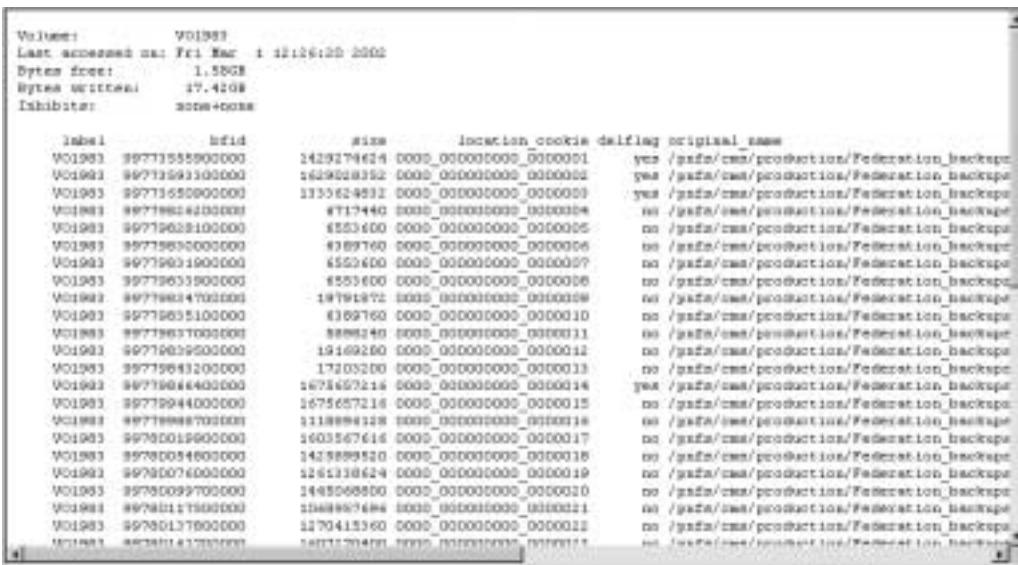
There are a couple of pages that present volume inventory information. One is straight text, discussed in this section. The other page is dynamically generated HTML; see section 9.17 *Tape Inventory Page (Dynamic HTML)*. The formats of both pages are similar.

- What?** For each volume declared to your Enstore system, there is a page that presents volume inventory information in straight text format. The page gets updated periodically; be aware that it may not reflect the most recent information.
- Why?** Use this page to find out details of the storage of your file(s) on a volume, to see how full a tape is, or to check the inhibits.
- How?** *If you only know the filename:* To arrive at the text web page, follow this string of links starting at the top page: click "Enstore Server Status"; then under *Shortcuts*, click "Full File List". Click on your file of interest. This will take you to the **Library Manager Queues** page for the appropriate library manager. Find your file, and click the corresponding volume ID to come to the inventory page for that volume.
- If you know the volume name:* To arrive at the text web page, follow this string of links starting at the top page: click "Enstore Server Status"; then look for the volume name listed with one of the active library managers, and click on the volume.

## Page Description

At the top of the volume inventory (text) page, you'll find the volume ID, the last accessed date, the number of bytes free, the number of bytes written, and the inhibits (described below).

The volume inventory contains a line for each file on the volume, listed in location order. In addition to the tape label, this page lists the bfid, size, location\_cookie, delflag, and original\_name (the name given in the **encp** command used to write it). Scroll down to the bottom of the page to find information for the tape volume itself.



The screenshot shows a web browser window displaying a volume inventory page. At the top, there is a summary section for Volume ID: V01983, Last accessed on: Fri Mar 1 12:26:20 2002, Bytes free: 1,5828, Bytes written: 17,4208, and Inhibits: none+none. Below this is a table with columns: label, bfid, size, location\_cookie, delflag, and original\_name. The table lists 20 files with their respective attributes. The last row of the table is for the volume itself, with label V01983, bfid 00000000000000000000, size 00000000000000000000, location\_cookie 00000000000000000000, delflag 00000000, and original\_name /gafn/cma/production/Federation\_backup.

label	bfid	size	location_cookie	delflag	original_name
V01983	00773555900000	1429174624	0000_00000000_00000001	yes	/gafn/cma/production/Federation_backup
V01983	00773555900000	1429174624	0000_00000000_00000002	yes	/gafn/cma/production/Federation_backup
V01983	00773555900000	1335624832	0000_00000000_00000003	yes	/gafn/cma/production/Federation_backup
V01983	00773555900000	8717440	0000_00000000_00000004	no	/gafn/cma/production/Federation_backup
V01983	00773555900000	8553600	0000_00000000_00000005	no	/gafn/cma/production/Federation_backup
V01983	00773555900000	8389760	0000_00000000_00000006	no	/gafn/cma/production/Federation_backup
V01983	00773555900000	8553600	0000_00000000_00000007	no	/gafn/cma/production/Federation_backup
V01983	00773555900000	8553600	0000_00000000_00000008	no	/gafn/cma/production/Federation_backup
V01983	00773555900000	18791872	0000_00000000_00000009	no	/gafn/cma/production/Federation_backup
V01983	00773555900000	8389760	0000_00000000_00000010	no	/gafn/cma/production/Federation_backup
V01983	00773555900000	8888240	0000_00000000_00000011	no	/gafn/cma/production/Federation_backup
V01983	00773555900000	10169280	0000_00000000_00000012	no	/gafn/cma/production/Federation_backup
V01983	00773555900000	17035200	0000_00000000_00000013	no	/gafn/cma/production/Federation_backup
V01983	00773555900000	1678457216	0000_00000000_00000014	yes	/gafn/cma/production/Federation_backup
V01983	00773555900000	1675657216	0000_00000000_00000015	no	/gafn/cma/production/Federation_backup
V01983	00773555900000	1188884320	0000_00000000_00000016	no	/gafn/cma/production/Federation_backup
V01983	00773555900000	1603567616	0000_00000000_00000017	no	/gafn/cma/production/Federation_backup
V01983	00773555900000	1429889520	0000_00000000_00000018	no	/gafn/cma/production/Federation_backup
V01983	00773555900000	1261338624	0000_00000000_00000019	no	/gafn/cma/production/Federation_backup
V01983	00773555900000	1485068800	0000_00000000_00000020	no	/gafn/cma/production/Federation_backup
V01983	00773555900000	1188884320	0000_00000000_00000021	no	/gafn/cma/production/Federation_backup
V01983	00773555900000	1170415360	0000_00000000_00000022	no	/gafn/cma/production/Federation_backup
V01983	00773555900000	1429889520	0000_00000000_00000023	no	/gafn/cma/production/Federation_backup

## Inhibits

The inhibits are listed on the page in the format `system_inhibit[0] - system_inhibit[1]`.

`system_inhibit[0]` can take any of the following values:

none	the normal state (no inhibits)
READONLY	volume is read-only
DELETED	volume has been deleted
NOACCESS	no access allowed (set by system to prevent further access to volume on which it found an error; once the problem is resolved, operator must clear the NOACCESS state)
NOTALLOW	no access allowed (set manually by the operator to prevent access to volume)

`system_inhibit[1]` can take any of the following values:



none	the normal state (no inhibits)
full	volume is full

## 9.9 Movers Page

---

- What?** The **Movers** page displays the current status of all the movers. (The mover statuses are described in section 9.4 *Enstore Server Status*.)
- Why?** Use this page to see how far into a job a mover is, or to check other job details related to the mover, e.g., what volume is being used for your job.
- How?** There are several paths to arrive at this page (see section 9.18 *Enstore Web Page Map*). The two easiest and most common are:
- On the top page click “Enstore Server Status”. Click on a mover.
  - On the top page click “Enstore Server Status”. Choose a library manager to get to the **Library Manager Queues** page, then click on a mover.
  -

When you click on a specific mover, you are brought to the entry for that mover on the **Movers** page.

### Page Description

This web page shows the most recent known state of all of the movers in the Enstore system. The first image (below) shows the field headings. The online help page provides a detailed description of the fields.

Movers Page

Name	Status	Host	Date/Time	Last Time Alive
994004.mover	alive   IDLE	40enav9da	2002-May-10 14:34:18	
	Completed Transfers	3029	Failed Transfers	0
	Last Read (bytes)	80,224,557	Volume	PRJ154
	Last Write (bytes)	80,224,357	Location Cookie	124
<pre>/prj154/destro/copy1/data/aggf/initial_rms/60fams/root-tp/initial/recoA_reco_all_0000146562_rmg_236-236.raw_p10.15.00.root --&gt; 40enav9da/destro/etl/cab/cache/5b-co/recoA_reco_all_0000146562_rmg_236-236.raw_p10.15.00.root</pre>				

This next image shows movers that are busy mounting, seeking and writing tapes. The pnfs and user filenames are given as appropriate:

<b>D31CLTO.mover</b>	alive : busy mounting volume PRK221L1	@0enrrr22a 2002-May-10 14:34:06
	Completed Transfers	3736
	Failed Transfers	0
	Current Read (bytes)	0
	Current Write (bytes)	0
	Volume	PRK221L1
	EOD Cookie	0
	d0mno/rans/cache21/nkhef/reco_nrcp10_p10.15.01_nkhef_pytha_cabw00+03+27+tr-qg-fia0h-4.2+TM-174.3+PrGt5.0+KndMc-60.0+EaLs4.2+KndMLi-130.0-PlateCarp-RecoRcp-larMCK_nrb-pouon-0.5_4032_02119114525 --> /pnfs/lan/fo/copy1/monte_cab/phase10nuc99/reco/all/reco_nrcp10_p10.15.01_nkhef_pytha_cabw00+03+27+TrGt-4.2+TM-174.3+PrGt5.0+KndMc-60.0+EaLs4.2+KndMLi-130.0-PlateCarp-RecoRcp-larMCK_nrb-pou0.5_4032_02119114525	
<b>D31DLTO.mover</b>	alive : SEEK	@0enrrr17a 2002-May-10 14:34:08
	Completed Transfers	1587
	Failed Transfers	
<b>D31ELTO.mover</b>	alive : busy writing 1,536,695,557 bytes to Enstore	@0enrrr10a 2002-May-10 14:34:05
	Completed Transfers	1405
	Failed Transfers	0
	Current Read (bytes)	701,759,311
	Current Write (bytes)	655,884,288
	Volume	PRK217L1
	EOD Cookie	151
	d0bba/d0/rnpe7/ranspet/14573/rstore_in_progress/reco_all_0000153407_028.raw_p10.15.01_000 --> /pnfs/lan/fo/copy1/datalogger/initial_rans/d0farn/reco/all/reco_all_0000153407_028.raw_p10.15.01_000	

This image shows movers that are idle (awaiting a job), and busy reading a tape:

<b>994012.mover</b>	alive : IDLE	@0enrrr12a 2002-May-10 14:34:11
	Completed Transfers	3253
	Failed Transfers	1
	Last Read (bytes)	279,315,792
	Last Write (bytes)	279,315,792
	Volume	PRJ177
	Location Cookie	113
	/pnfs/lan/dzrc/copy1/datalogger/initial_rans/d0farn/root-tape/d0farnA_reco_all_0000146562_rmg_197-199.raw_p10.15.00.root --> d0mno/rans/rnnot/cab/cache1/boof/recoA_reco_all_0000146562_rmg_197-199.raw_p10.15.00.root	
<b>994019.mover</b>	alive : busy reading 677,385,094 bytes from Enstore	@0enrrr19a 2002-May-10 14:34:09
	Completed Transfers	3194
	Failed Transfers	0
	Current Read (bytes)	367,132,672
	Current Write (bytes)	0
	Volume	PRJ443
	Location Cookie	108
	/pnfs/lan/dzrc/copy1/datalogger/initial_rans/d0farn/root-tape/d0farnA_reco_all_0000146499_rmg_017-022.raw_p10.15.00.root --> d0mno/rans/rnnot/cab/cache1/boof/recoA_reco_all_0000146499_rmg_017-022.raw_p10.15.00.root	

## Understanding the Number of Bytes Read/Written

For a READ job,

“Last/Current Read (bytes)” means “bytes read from tape”

“Last/Current Write (bytes)” means “bytes written to user’s file”

whereas for a WRITE job,

“Last/Current Read (bytes)” means “bytes read from user’s file”

“Last/Current Write (bytes)” means “bytes written to tape”

For jobs in progress, the number of “Current Read (bytes)” is by necessity higher than “Current Write (bytes)”.

For finished jobs (e.g., of status IDLE or busy dismounting volume), you can compare “Last Read (bytes)” to “Last Write (bytes)” to tell if a job was a READ or WRITE. The file size is always bigger on tape than on the user’s disk because the file family wrapper is on the tape copy only. So for example, on a READ job, Enstore reads a larger file from tape and writes a smaller one to disk, and thus the “Last Read (bytes)” value is larger than “Last Write (bytes)” (as shown in image below). The converse is true for a WRITE job.

DE36M2.mover	status: IDLE	d0enstore06	2002-May-10 13:34:25
Completed Transfers		12	Failed Transfers 0
Last Read (bytes)		48,765,342	Volume PE
Last Write (bytes)		48,765,111	Location Cookie 26

## 9.10 Encp History

---

- What?** This page lists the last several **encp** transfers that have completed, either successfully or with an error.
- Why?** Use this page to review recent **encp** transfers.
- How?** To arrive at the **Encp History** page, click “Encp History” on the top page or the **ENCP** button at the top of any page.

### Page Description

On the **Encp History** page:

- Successful transfers show time that transfer completed, node, username and storage group, mover interface (the TCP/IP interface used on the mover node), bytes transferred, volume ID, and data transfer rate and user rate (both in Mb/s)
- Unsuccessful transfers show time of attempted transfer, node, username, storage group and error summary. Each error summary contains a link to a more detailed error message.

The top portion of the page is a table listing details of each recent transfer:

Home

System

Servers

Encp

Help

Encp History

Brought To You By: The Inquisitor

Last updated: 2002 May 30 17:08:41

D9EN: Enstore for the D9/Runit AML/2

Time	Node	User/Storage Group	Mover Interface	Bytes	Volume	Data Transfer Rate (MB/S)	User Rate (MB/S)
2002-05-10 15:08:40	d0test-g0	jocvsk/D0	d0enware1a	<a href="#">61627653 (1)</a>	from NULLA40	1.03	0.832
2002-05-10 15:08:31	d0test-g0	jocvsk/D0	d0enware3b	<a href="#">122012026 (2)</a>	from NULLA50	1.04	0.967
2002-05-10 15:08:26	d000en	jen	d0enware22a	<a href="#">220971281 (3)</a>	to PRK220L1	0.759	0.457

The value under *Bytes* provides a link to the *Files Transferred* area of the page which gives you the originating and destination file names:

Files Transferred	
1	/pub/ram/NULL/test_harness/Jun_04_2001_16_58_10_Stream_1_0037095238_001.raw -> /ram/test10/jocvsk/dew/chris/boo/Jun_04_2001_16_58_10_Stream_1_0037095238_001.raw
2	/pub/ram/NULL/test_harness/Jun_04_2001_20_14_49_Stream_2_0037600162_001.raw -> /ram/test10/jocvsk/dew/chris_4/boo/Jun_04_2001_20_14_49_Stream_2_0037600162_001.raw
3	/d0/stripe5/vantest/14574/stor_in_progress/veroS_all_0000153408_054.raw_p10.15.01 -> /pub/ram/to/copy1/datalogger/initial_run/d000rm/reco/all/veroS_all_0000153408_054.raw_p10.15.01

At the very bottom of the page, you can find the errors in red, if any:

ERRORS	
1	INFILE=/pub/ram/TrueFederation/data/jetnet_production/Dags/2e33_jetDags120_452_FINAL_D/jm_hh1520EVD6_jet0900.IS OUTFILE=/home/Federation/data/jetnet_production/Dags/2e33_jetDags120_452_FINAL_D/jm_hh1520EVD6_jet0900.IS.aarw FILESIZE=1697644544 LABEL= LOCATION= DRIVE= DRIVE_SH= TRANSFER_TIME=0.00 SEEK_TIME=0.00 MOUNT_TIME=0.00 QWAIT_TIME=0.00 TIMEINQW=0.00 STATUS=TOO MANY ERRORS (TCP connection closed, None)

## 9.11 Configuration

**What?** The **Enstore Configuration** page shows the Enstore system's current configuration.

**Why?** This page is for administrators. But if you want configuration information on any component in the Enstore system, you can look here. For example:

- If you see a server listed as unmonitored (in grey) on the **Enstore Server Status** page, you can verify its status here (if the element `inq_ignore` appears, the server is unmonitored).
- If you want to check the log files for activity related to a particular mover, look here for the `logname` value associated with the mover, then search the log files for that string.

**How?** To arrive at the **Enstore Configuration** page, click “Configuration” on the top page.

## Page Description

The page is divided into two sections:

- The first section provides a quick link to each of the servers listed in the table in the second section.
- The second section, is a (potentially quite long) table containing detailed configuration information for all of the Enstore servers. For each server, there is a table row for each element that appears in the server’s configuration. The information displayed includes the element name and its current value. No interpretation of the values is done, so for instance if the value is a python dictionary, then it is presented here as such. The server names, and under them the element names, are organized alphabetically.

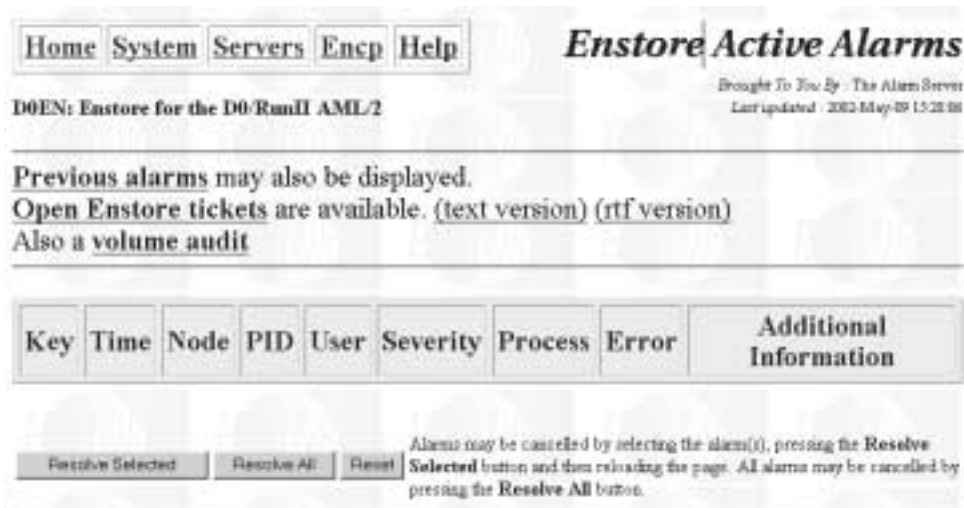
This image shows the top of the table in the second section on the **Enstore Configuration** page, including the (truncated) entry for one of the system’s movers:

Server	Element	Value
994004.mover	check_writes_file	30
	compression	0
	data_ip	d0enrr4a
	device	/dev/tusb/lp0/lis
	dumout_delay	10
	do_cleaning	No
	driver	FTLDriver
	host	d0enrr4a
	hostip	131.225.164.27
	library	memio library_manager
	logname	BED4h4V

## 9.12 Enstore Active Alarms

---

- What?** The **Enstore Active Alarms** page lists the alarms that have been raised but not yet resolved.
- Why?** This page is for administrators, but as a user, you can always look here for information when there is a problem with Enstore. In particular, if a volume is set to NOACCESS, you can look here to find out which mover was involved.
- How?** To arrive at the **Enstore Active Alarms** page, click “Alarms” on the top page.



## 9.13 Enstore Log Files

---

- What?** The **Enstore Log Files** page provides links to Enstore system-specific user log files and to standard Enstore daily log files. You can search log files or retrieve entire log files.
- Why?** This page is for administrators. You can use the log files to retrace Enstore activity, to understand Enstore problems or behavior, and so on.

**How?** To arrive at the **Enstore Log Files** page, click “Log Files” on the top page.

There are three sections to the **Enstore Log Files** page.

## Link to Search Page

First there is a link to a search page; look for “Enstore log files may also be *searched*”. The search page is shown in this image:

Search Criteria	Description
today	today's log file
week	the last 7 log files (if available) including today
month	the last 30 log files (if available) including today
all	all the log files
YYYY-MM-DD	Specific log file(s)

Use the **HELP** button for information on constructing your search string.

## User Specified Log Files

The next part is entitled *User Specified Log Files*. It lists miscellaneous log files configured and maintained for your Enstore system:

Search Criteria	Description
today	today's log file
week	the last 7 log files (if available) including today
month	the last 30 log files (if available) including today
all	all the log files
YYYY-MM-DD	Specific log file(s)

**User Specified Log Files**

- [FAILED Transfers](#)
- [6509 BigA Switch Info](#)
- [AML/2 Logs](#)
- [Active Monitor Log](#)
- [Candor](#)
- [D0En Cluster Console Logs](#)

Any given Enstore installation may contain some or all of these log files:

FAILED Transfers	Lists all encp jobs that failed; lists by volume and by mover
Recent (robot) log messages	Displays all the messages from the robot (for the most recent few days)
Active Monitor Log	Displays the data transfer rate between the base node and all other nodes in the same Enstore system, including movers
Cambot	Displays a live image photographed by a camera mounted inside the D0 ADIC robot
Enstore Node Information	Displays information on all nodes belonging to this Enstore system.
Network-At-A-Glance	Displays network interface status of all nodes relative to base node; uses colored icons for easy identification of problems
PNFS Counters	Displays how much space is used in each PNFS directory
PNFS Export List	Lists all the existing PNFS areas for the Enstore system (when PNFS is mounted, these are the areas that get NFS-mounted)
Cluster UDP Clogup Info	Displays UDP activity in the Enstore system
Cluster Console Logs	logs from consoles
Cluster SDR Info	Displays hardware information, e.g., temperatures, fan speeds, voltages, and so on, for all nodes (servers and movers)
Cluster SEL Info	Displays System Event Log for all nodes in system
Internode Rates or Network Rate Test	Displays data transfer rates between each node and the base node <sup>1</sup>
6509 BigA Switch Info (D0)	Displays information relating to switch's status

---

1. The Active Monitor Log uses a different base node (<system>server2) from the Internode Rates or Network Rate (<system>server3).



## Enstore Log Files

The bottom portion of the page is called *Enstore Log Files*. It displays a calendar of the current and previous months from which you can click the date of the log file to view (the image below was captured on May 10, 2002, the last date that shows an entry). The size of the log file is given.

Requesting a day's log file is memory intensive.



May 2002						
Mon	Tue	Wed	Thu	Fri	Sat	Sun
		<a href="#">1</a> 26366752	<a href="#">2</a> 56749485	<a href="#">3</a> 77851346	<a href="#">4</a> 64334372	<a href="#">5</a> 23019703
<a href="#">6</a> 51636367	<a href="#">7</a> 54684323	<a href="#">8</a> 52531844	<a href="#">9</a> 50297533	<a href="#">10</a> 21795844	<a href="#">11</a>	<a href="#">12</a>
<a href="#">13</a>	<a href="#">14</a>	<a href="#">15</a>	<a href="#">16</a>	<a href="#">17</a>	<a href="#">18</a>	<a href="#">19</a>
<a href="#">20</a>	<a href="#">21</a>	<a href="#">22</a>	<a href="#">23</a>	<a href="#">24</a>	<a href="#">25</a>	<a href="#">26</a>
<a href="#">27</a>	<a href="#">28</a>	<a href="#">29</a>	<a href="#">30</a>	<a href="#">31</a>		

Mon	Tue	Wed	Thu	Fri	Sat	Sun
<a href="#">1</a> 26507063	<a href="#">2</a> 6915870	<a href="#">3</a> 49783541	<a href="#">4</a> 83277061	<a href="#">5</a> 41721229	<a href="#">6</a> 36082192	<a href="#">7</a> 17039327
<a href="#">8</a> 53869998	<a href="#">9</a> 78779533	<a href="#">10</a> 43315645	<a href="#">11</a> 38852489	<a href="#">12</a> 25081168	<a href="#">13</a> 34921631	<a href="#">14</a> 28004612
<a href="#">15</a> 24526480	<a href="#">16</a> 51755642	<a href="#">17</a> 53806764	<a href="#">18</a> 48422384	<a href="#">19</a> 21498976	<a href="#">20</a> 9151488	<a href="#">21</a> 28565206

## 9.14 Quota and Usage

---

- What?** The **Quota and Usage** page provides information on your Enstore volume usage, organized by library and by storage group. The page is not real-time, it displays a recent snapshot.
- Why?** Administrators and users can look here to see a variety of details about your Enstore system's resource and quota management.
- How?** To arrive at the **Quota and Usage** page, click "Quota and Usage" on the top page.

This page displays the following fields:

Library	library manager
Storage Group	storage group

Req. Alloc.	requested volume (e.g., tape) allocation
Auth. Alloc.	authorized volume allocation
Quota	total space allowed in robot
Allocated	total number of volumes currently allocated in the robot
Blank Vols	of the allocated volumes, the number that are blank
Written Vols	of the allocated volumes, the number that are written
Deleted Vols	of the allocated volumes, the number that have been deleted
Space Used	total space used on all allocated volumes
Active Files	total number of active (non-deleted) files on all allocated volumes
Deleted Files	total number of deleted files on all allocated volumes
Unknown Files	

## 9.15 Enstore Plots

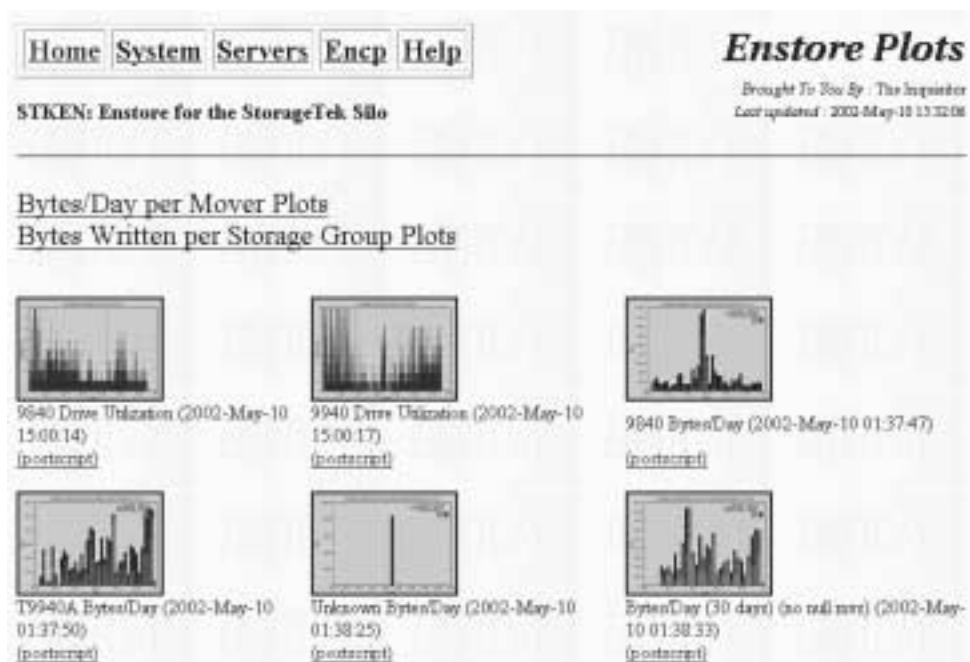
---

- What?** The **Enstore Plots** page provides information on Enstore performance in a visual format. These are not real-time, they are snapshots.
- Why?** You can look here to see a variety of details about your Enstore system's recent performance.
- How?** To arrive at the **Enstore Plots** page, click "Plots" on the top page.

The **Enstore Plots** page, provides information on some statistics that Enstore gathers. These statistics are gathered from the log files produced by Enstore. Several plots are available:

- Drive Utilization
- Bytes/Day Plot
- Bytes/Day per Mover Plot
- Mount Latency Plot
- Mounts/Day per Drive Type
- Storage group activity (STKEN only)

- Total bytes/Day
- Total bytes/Day combining all three systems (D0EN, CDFEN, STKEN)
- Total bytes written/Day
- Cumulative Mounts Plot
- Transfer Activity (log) Plot
- Transfer Activity Plot
- Mounts/Day Plot
- Null Terabytes/Day (Instantaneous Rate Plot)
- Real Terabytes/Day (Instantaneous Rate Plot)



All the plots are described in the online help page. Each plot is available for viewing three ways:

- a small version of the plot (postage stamp) displayed directly on the page
- a full size version of the plot; click on the postage stamp to display
- a postscript copy of the plot; click on the (postscript) link to display

## 9.16 NGOP Monitoring

---

NGOP stands for “Next Generation OPerations”. This link requires a password to get in, and is typically reserved for administrators. It displays information relating to the Enstore node, e.g., daemons, the operating system, hardware, cron jobs, enstore nodes, and so on.

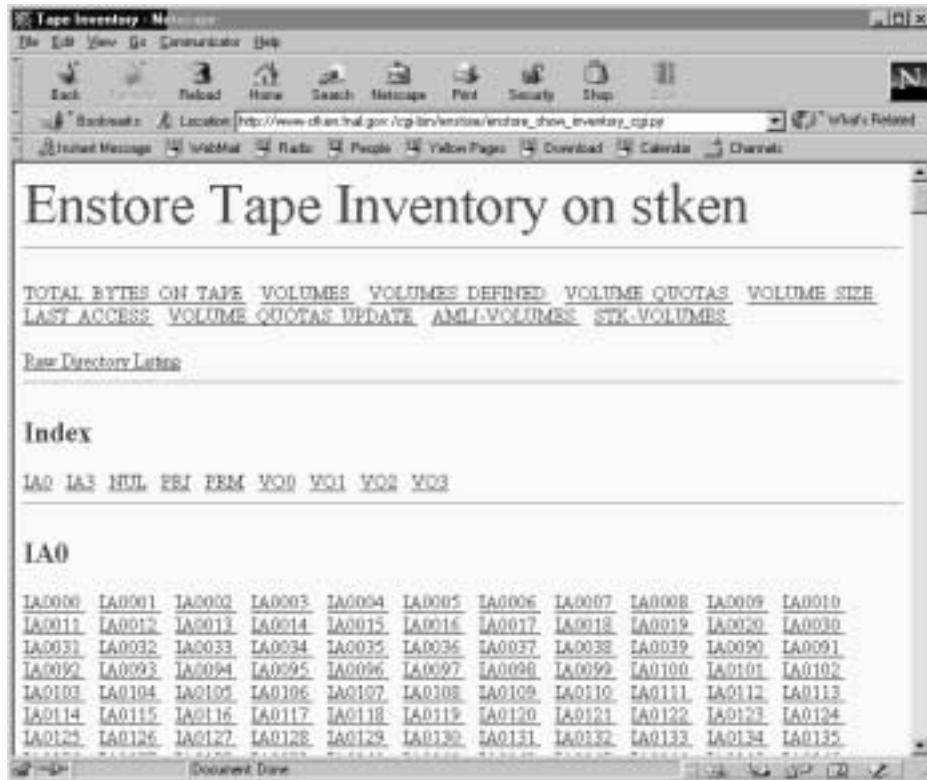
## 9.17 Tape Inventory Page (Dynamic HTML)

---

- What?** For each volume declared to your Enstore system you can dynamically (re)create a page that presents its volume inventory information in HTML format.
- Why?** Use this page to find out details of the storage of your file(s) on a volume, to see how full a tape is, or to check the inhibits.
- How?** To arrive at this page start at the top page, scroll down to the *Information* table, and click “Tape Inventory”. This brings you to a list of all declared volumes in your Enstore system. Click on the volume of interest.



This page is dynamic and uses a lot of server time; please minimize the number of times you regenerate this page.



Find the volume of interest and click it to get a file listing. The format is essentially identical to that shown in section 9.8 *Tape Inventory Page (Text)*, but in addition under the heading, you get a list of volume parameters:

```
{'blocksize': 131072,
 'capacity_bytes': 20401094656L,
 'declared': 998086428.80971301,
 'eod_cookie': '0000_0000000000_0000446',
 'external_label': 'V00094',
 'first_access': 998268618.43976796,
 'last_access': 1013139175.787874,
 'library': 'eagle',
 'media_type': '9840',
 'non_del_files': 445,
 'remaining_bytes': 2269696L,
 'sum_rd_access': 35,
 'sum_rd_err': 0,
 'sum_wr_access': 445,
 'sum_wr_err': 0,
 'system_inhibit': ['none', 'full'],
 'user_inhibit': ['none', 'none'],
 'volume_family': 'theory.theory-canopy-eichten.cpio_odc',
 'wrapper': 'cpio_odc'}
```

## 9.18 Enstore Web Page Map

---

This section is planned to consist of two tables, one for each section of an Enstore installation's top page (see section 9.1 *Top Page*), namely *Enstore System Status*, and *Information*.

### Table Format

In the following table(s), web page titles are printed in **bold**, headings on the web pages in *italic*, and items you can choose (i.e., links) in plain font. An arrow after a link means "takes you to" as in "option X takes you to page Y".

The left-most column displays the menu options on the top page, and the page to which each one takes you. The next column to the right displays a heading or an option you can choose on that page, and so on moving to the right.

### 9.18.1 Enstore System Status

All HTML pages in this section have additional links provided by the quick link buttons described in section 9.1 *Top Page*.

**Table 9.18.1-a: Enstore System Status**

Enstore System Summary -> <b>Enstore Status-At-A-Glance</b> (sec. 9.3)	<i>Enstore Overall Status</i> heading	network -> <b>Enstore Status-At-A-Glance</b> page, <i>Enstore Network Interface Status</i> heading (sec. 9.3) (no further links)		
		alarms -> <b>Enstore Active Alarms</b> (sec. 9.12)	Previous alarms -> <b>Enstore Alarm Search</b> (no further links)	
	<i>Enstore Individual Server Status</i> heading	All links under this heading point to the <b>Enstore Server Status</b> page (see below)		

**Table 9.18.1-a: Enstore System Status**

	<i>Enstore Node/Server Mapping</i> heading (no further links)			
Enstore Server Status -> <b>Enstore Server Status</b> (sec. 9.4) ( <i>Shortcuts</i> provides intrapage links only.)	Choose a library manager -> <b>Library Manager Queues</b> (sec. 9.6)	Next to <i>Reads</i> , choose Full Queue Elements -> <b>Full Library Manager Info</b> (sec. 9.7)	Choose a mover -> <b>Movers</b> (sec. 9.9) (no further links)	
		Under <i>Reads</i> , choose a volume ID --> <b>volume inventory (text page)</b> (sec. ) (no further links)		
		Under <i>Reads</i> or <i>Writes</i> , choose a mover -> <b>Movers</b> (sec. 9.9) (no further links)		
	choose a media changer ->			
	choose a mover -> <b>Movers</b> (sec. 9.9) (no further links)			
	Full File List -> <b>Active File List</b> (sec. 9.5)	choose a file -> <b>Library Manager Queues</b> (sec. 9.6)	Next to <i>Reads</i> , choose Full Queue Elements -> <b>Full Library Manager Info</b> (sec. 9.7)	choose a mover --> <b>Movers</b> (sec. 9.9) (no further links)

**Table 9.18.1-a: Enstore System Status**

			Under <i>Reads</i> , choose a volume -> <b>Volume inventory text page</b> (sec. ) (no further links)	
			under <i>Reads</i> or <i>Writes</i> , choose a mover -> <b>Movers</b> (sec. 9.9) (no further links)	
encp History -> <b>Encp History</b> (sec. 9.10)	(intrapage links only)			
Configuration -> <b>Enstore Configuration</b> (sec. 9.11)	(intrapage links only)			
Alarms -> <b>Enstore Active Alarms</b> (sec. 9.12)	Previous alarms -> <b>Enstore Alarm Search</b> (no further links)			
Log Files -> <b>Enstore Log Files</b> (sec.9.13)	choose an item -> corresponding log file page (further links are page-dependent)			
Quota and Usage -> <b>latest volume quota (text page)</b> (sec. )	(no further links)			
Plots -> <b>Enstore Plots</b>	Installation-dependent links (For each plot, click for full-size; links to PS only)			



**Table 9.18.1-a: Enstore System Status**

Production Sys- tem's Overall Status -> <b>Enstore Pro- duction Sys- tems Status</b>	Choose an Enstore installa- tion -> <b>System At-A-Glance</b> (for that installa- tion); see above			
Under the <i>Information</i> heading: Tape Inventory -> <b>Enstore Tape Inven- tory on [system_name]</b>	Choose a vol- ume id -> <b>latest volume quota (html)</b> (sec. 9.17)			

